

August 14, 1972

To: S. M. Krimigis, C. D. Wende, J. W. Kohl
From: T. P. Armstrong and R. L. McCutcheon
Subject: IMP-H CPME Data Analysis Plans

Post-launch experimenter's data tapes from IPD at Goddard will each contain about 4 days worth of data. Creation of the Archives tapes with decompressed count rates and uncertainties only will yield about 4 days per tape using higher bit density and blocking factors on the Archives tape. Copying the raw, uncompressed and uncorrected decom data from the experimenter's tape onto the Archives tape will almost double the size of the Archives tape file and increase the logical record size to an unwieldy degree. It seems highly desirable to avoid recopying the experimenter's decom tape if at all possible. Further, it seems advisable to apply any R vs r corrections at the level of creating the Archives tape. We, therefore, propose the Archives tape contain only the decompressed, R vs r corrected count rates and uncertainties, along with ephemeris data. In the unlikely event of needing raw decom data, the user would have to utilize the original experimenter's tape which would be retained. We presume that the Archives tape as described above will be of adequate reliability to serve the purpose of deposition at the NSSDC.

The creation of 1-hour, 3-hour, and 24-hour averages will be based on the Master Science Tape File, and will follow its creation. This simplifies tape handling (fewer tapes) during the initial run and also facilitates processing data out of sequence, as usually happens in the IMP programs.

On averaged data the times and ephemeris parameters associated with a given average will be the midpoint times. Start times and stop times should be retained on the 1-hour, 3-hour, and 24-hour averages.

Action Items:

1. CDW -- Generate R vs r formulas for GM tube corrections.
2. All -- Decide on criteria (agree) for special events
 - a. anisotropies
 - b. onsets
 - c. X-rays
 - d. spectral variations
 - e. composition variations
3. CDW -- Provide formula for generating X-ray fluxes and spectral parameters for use in DETAIL
4. TPA -- Write DETAIL
5. All -- Decide on what parameters to Plot from MST


Thomas P. Armstrong


Richard L. McCutcheon

TPA/RLM/mwf

RLM

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Please refer to:
TSSD-2884

JAN 13 1972

Director
National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Attention: Mr. B. H. Ferer/CODE 701.1

Subject: IMP-H CPME Experimenter's Tape

References: (a) GSFC Memo by J. H. Schmidt, "IMP-H Data Tape Format Letter", dated November 16, 1971

(b) APL Letter TSSD-2815, dated December 10, 1971

Enclosure: (1) APL Memo SLP-853-72, dated January 5, 1972, "Revised Tape Format for the IMP-H CPME Experimenter's Tape".

Dear Sir:

Reference b specified the requirements for the IMP-H CPME Experimenter's Tape. This is superseded by the information in Enclosure (1). Changes have been made to reflect the requirement that all digital performance parameters be given for every telemetry read-out. Previously they were requested once for each telemetry page. Also, the five to one blocking factor has been reduced to two to one in order to help the Information Processing Division reduce their total core storage requirements, as requested.

If further information is required, please contact Mr. R. L. McCutcheon at telephone number (301) 953-7100, extension 2441.

Very truly yours,

Original signed by
R. B. Kershner

R. B. Kershner
Space Development
Department Head

RLM
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SLP-853-72
January 5, 1972

TO: Distribution

FROM: R. L. McCutcheon

SUBJECT: Revised Tape Format for the IMP-H CPME Experimenter's Tape.

The tape format for ID records and data records are given below, in tables I and II, respectively. Both types of records have the same length, with "fill" of zeros where it is requested.

Each experimenter tape should contain an end of file mark only at the end of the tape, to indicate just that. Hence, ID records and data records should be found continuously in the input stream, with the first word of the ID records used as an indicator.

Each logical record should be 4797 bytes (8 bits) long and they should be blocked 2 to 1 for a block size of 9,594 bytes. The last block on the tape can contain less than 2 logical records. Seven-track 800 BPI tapes are requested.



R. L. McCutcheon

RIM:dgb
Distribution
COBostrom
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JLGunther
JWKohl
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RIMcCutcheon (2)
SLP File
Archives (2)

TABLE I - ID Record Format

Item Number	Item Description	Target Field Size (bits)	8-Bit Byte Offset
1	id record indicator: set to 32 ones	32	0
2	satellite ID number: eight EBCDIC characters	64	4
3	station id - binary integer	32	12
4	analog tape number 4 EBCDIC characters	32	16
5	analog file number 4 EBCDIC characters	32	20
6	record date (YMMDDbbb) 8 EBCDIC characters	64	24
7	analog start time (HHMM) 4 EBCDIC characters	32	32
8	analog stop time (HHMM) 4 EBCDIC characters	32	36
9	data type - binary integer 0 = normal 1 = encoder bypass 2 = encoder failure 3 = uncoded	32	40
10	experimenter ID 4 EBCDIC characters	32	44
11	data rate 0 = low bit rate 1 = high bit rate	32	48
12	master edit tape number 4 EBCDIC characters	32	52

TABLE I - Continued

Item Number	Item Description	Target Field Size (bits)	8-Bit Byte Offset
13	master edit file number 4 EBCDIC characters	32	56
14	fill to data record length	37895	60
14	average sequence time 6 EBCDIC characters	64	4797 60
15	Perigee counter 3 characters	32	18 68
16	day of next perigee 4 char.	32	72
17	time of day of next perigee 4 char. HHMM	32	76
18	fill	37735	80

mel Banks 4/11/72

E1

5	1,1	2,1	3,1	4,1	5,1	6,1	7,1	8,1	9,1	} page 0
1	1,2	2,2	3,2	4,2	5,2	6,2	7,2	8,2	9,2	
2	1,3	2,3	3,3	4,3	5,3	6,3	7,3	8,3	9,3	
3	1,4	2,4	3,4	4,4	5,4	6,4	7,4	8,4	9,4	
SS 0	1,5	2,5	3,5	4,5	5,5	6,5	7,5	8,5	9,5	} page 1
1	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.
3	1,8	2,8	3,8	.	.	.	.	.	9,8

SS 0	1,29	2,29	3,29	9,29	} page 7
1	1,30	2,30	3,30	.	.	.	.	.	9,30
2	1,31	2,31	3,31	.	.	.	.	.	9,31
3	1,32	2,32	3,32	.	.	.	.	.	9,32

E3

SS 0	1,1	2,1	3,1	4,1	5,1	6,1	7,1	8,1	9,1	} page 0
2	1,2	2,2	3,2	4,2	5,2	6,2	7,2	8,2	9,2	
SS 0	1,3	2,3	3,3	4,3	5,3	6,3	7,3	8,3	9,3	} page 1
2	1,4	2,4	3,4	4,4	5,4	6,4	7,4	8,4	9,4	

SS 0	1,15	2,15	3,15	4,15	5,15	6,15	7,15	8,15	9,15	} page 7
2	1,16	2,16	3,16	4,16	5,16	6,16	7,16	8,16	9,16	

E2A like E3

R2

	P0			P2			P4			P6			P7			
	1	2,1	3,1	4,1	5,1	6,1	7,1	8,1	9,1	10,1	11,1	12,1	13,1	14,1	15,1	16,1
Z	1	2,1	3,1	4,1	5,1	6,1	7,1	8,1	9,1	10,1	11,1	12,1	13,1	14,1	15,1	16,1
A4	1,2	2,2	3,2	4,2	5,2	6,2	7,2	8,2	9,2	10,2	11,2	12,2	13,2	14,2	15,2	16,2
A3	1,3	2,3	3,3	4,3	5,3	6,3	7,3	8,3	9,3	10,3	11,3	12,3	13,3	14,3	15,3	16,3
A2	1,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,4
P11	1,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,5
P10	1,6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,6
E4	1,7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,7
E5	1,8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,8
E6	1,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,9
E2B	1,10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,10
E2C	1,11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,11
P2	1,12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,12
P3	1,13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,13
P4	1,14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,14
P5	1,15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,15
P6	1,16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,16
P8	1,17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,17
Z2	1,18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,18

TABLE II - Data Record Format

Item Number	Item Description	Telemetry Sequences	Position Frames	Channel	Target Field Size (bits)	8-Bit Byte Offset
1	year ¹		time of page 0, sequence 0,		16	0
2	day		frame 0, of an even ²		16	2
3	milliseconds		album		32	4
4	spacecraft clock		same time as above		32	8
5	pseudo-sequence counter		same time as above		32	12
6	Se-1 ①	<i>E1=8</i> 2	2	8B/0, 2B/1	16	16 ³
	②	2	2	6B/1, 4B/2	16	18
	③	2	2	4B/2, 6B/3	16	20
	④	2	2	2B/3, 8B/4	16	22
	⑤	2	2	8B/11, 2B/12	16	24
	⑥	2	2	6B/12, 4B/13	16	26
	⑦	2	2	4B/13, 6B/14	16	28
	⑧	2	2	2B/14, 8B/15	16	30
	Repeat of above for sequences 6, 10, 14					
7	Se-2 ①-⑧	<i>E2A, E3, E2A, E3</i> 2, 6, 10, 14	10	same as item 6	16	80 <i>72</i>
8	Se-3 ①-⑧	<i>E4, P1, E4, P1</i> 3, 7, 11, 15	2	same as item 6	16	144 <i>104</i>
9	Se-4 ①-⑧	<i>A6, A1, Z1, P8</i> 3, 7, 11, 15	10	same as item 6	16	208 <i>208</i>
10	<i>R4(1)</i> R1 = M	<i>FLAG</i> 1	2	4B/6&7	16	272 = <i>110, 16</i>
11	R2 S	2	10	4B/6&7	16	280
12	R3 P9	3	2	4B/6&7	16	288
13	<i>R4(4)</i> R4 P7	3	10	4B/6&7	16	296
14	R5 Z1	3	10	4B/9&10	16	304

TABLE II - Continued

Item Number	Item Description	Telemetry Sequences	Position Frame	Channel	Target Field Size (bits)	8-Bit Byte Offset
15	R6 NA63	3,7,11,15	2	4B/6&7 <i>del 47</i>	16	312
16	R7 A6 A5	3,7,11,15	10	4B/6&7	16	320
17 <i>PR(1)</i>	R8 A5 Z3	1,9	4	4B/6&7	16	328 <i>124</i>
18	R9 A4	4,12	8	4B/6&7 <i>10 bits</i>	16	332
19	R10 A3	0,8	8	4B/6&7	16	336
20	R11 A2	5,13	4	4B/6&7	16	340
21	R12 P11	0,8	4	11&2B/12	16	344
22 <i>P2</i>	R13 P10	0,8	4	6B/12&4B/13	16	348
23	R14 E4	1,9 <i>SS 0#2</i>	4	11&2B/12	16	352
24	R15 E5	1,9 <i>SS 0#2</i>	4	6B/12 & 4B/13 <i>10 bits</i>	16	356
25	R16 E6 3	4,12 <i>S 1#3</i>	8	11&2B/12	16	360
26 <i>R2(1)</i>	R17 E28 4	4,12 <i>SS 1#3</i>	8	6B/12&4B/13	16	364
27	R18 E2C 5	0,8 <i>SS 0#2</i>	8	11&2B/12	16	368
28 <i>R2(2)</i>	R19 P2 3	0,8 <i>SS 0#2</i>	8	6B/12&4B/13	16	372
29	R20 P3	5,13 <i>SS 1#3</i>	4	11&2B/12	16	376
30	R21 P4	5,13 <i>SS 1#3</i>	4	6B/12&4B/13	16	380
31	R22 P5	0,8	12	11&2B/12	16	384
32	R23 P6	0,8	12	6B/12&4B/13	16	388
33	R24 P8	4,12	12	11&2B/12	16	392
34 <i>R2(18)</i>	R25 Z2	4,12 <i>SS 1#3</i>	12	6B/12&4B/13	16	396
35	data quality flags - 16 sequences ⁴				8	400 = 190 ₁₆
36	time quality flag - sequence 0				8	416

TABLE II - Continued

Item Number	Item Description	Telemetry Sequences	Position Frame	Channel	Target Field Size (Bits)	8-Bit Byte Offset
37	spacecraft clock	quality flag - sequence 0			8	417
38	DPP-a3,1-4	0,8	4	4	8	418
39	DPP-a3,13-16	0,8	8	4	8	420
40	DPP-a3,21-24	0,8	12	4	8	422 ^{1A6}
41	DPP-a3,5-8	1,9	4	4	8	424
42	DPP-a2,5-8	1,5,9,13	8	4	8	426
43	DPP-a2,9-12	1,5,9,13	12	4	8	430
44	DPP-a2,13-16	2,6,10,14	4	4	8	434
45	DPP-a2,17-20	2,6,10,14	8	4	8	438
46	DPP-a2,21-24	2,6,10,14	12	4	8	442
47	DPP-a2,25-28	3,7,11,15	4	4	8	446
48	DPP-a2,29-32	3,7,11,15	8	4	8	450
49	DPP-a2,33-36	3,7,11,15	12	4	8	454
50	DPP-a3,9-12	4,12	8	4	8	458
51	DPP-a3,17-20	5,13	4	4	8	460
52	AP16, & 1-15	ALL	0	4	8	462 ^{1CE16}
53	AP32, & 17-31	ALL	0	5	8	478
or	AP48, & 33-47	ALL	0	5	8	
54	OA data	4,12	4	4-15	8/chan	494
55	fill				16	518
56	repeat of items 1 thru 54					520-208 ₁₆
57	repeat of items 1 thru 54					1040
58	repeat of items 1 thru 54					1560

*Data Performance Parameter
 Analog Parameter
 Optical Aspect*

TABLE II- Continued

Item Number	Item Description	Telemetry Sequence	Position Frame	Channel	Target Field Size (bits)	8-Bit Byte Offset
59	items 1 thru 79 of attitude/orbit/ephemeris table-see attachment 1 of reference a				32	2080
60	repeat of items 1 thru 60 ⁵³ for the next album, an "odd" one					2396 = ^{95C16} <u>2396</u> 4792
61	five 8-bit byte to pad to a multiple of 36 bits					<u>5</u> 4797

*logical record size = 4797 bytes = 1066 36-bit words

Notes

- 1 All items are binary integers except for the attitude/orbit/ephemeris data, which is in IBM 360 floating point format.
- 2 An even album is one in which satellite clock lines \bar{a}_5 , \bar{a}_6 , and \bar{a}_7 are all ones. Note that $\bar{a}_7 = \bar{C}_{25}$ at 1600 BPS and $\bar{a}_7 = \bar{C}_{27}$ at 400 BPS.
- 3 Items 6 through 34 are telemetry data and should appear in the 16 bit target field as a 10 or 12 bit integer as they are specified. This should be the floating point compressed form as described in Appendix C, sheets 7-11 of the IMP H&J Encoder document.
- 4 Each quality flag should be a 2 bit integer right-justified in the 8 bit target field with the left-most 6 bits as zeros.
- 5 The DPP's should remain four to a channel as they appear in the telemetry read-out: $D_1D_2D_3D_4D_1D_2D_3D_4$; i.e., each one repeats.
- 6 The AP's should be placed in 8 bit fields so that the conversion to volts is as follows:

$$\text{VOLTS} = 5.75 - .025*(8 \text{ bit count});$$

i.e., 230 counts = 0. volts and
30 counts = 5. volts.